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Generation of internal waves by tidal flow over three-dimensional topography BENJAMIN KING, HEPENG ZHANG, HARRY L. SWINNEY, University of Texas at Austin — An understanding of the internal wave field generated by oscillatory tidal flow over three-dimensional topography is important for ocean models. Recent numerical work has compared the internal wave fields generated by 2D and 3D topography and found that 3D topography can be more than an order of magnitude less efficient at converting the M2 barotropic tide into internal waves.[1,2] While the previous studies focus on the energy conversion rate, we perform experiments and simulations to examine the generation regions and flow fields in detail. In particular, we present results from numerical simulations of oscillatory flow past supercritical, 3-dimensional topography (a half-sphere on a flat plane). These results are compared to experiments performed on similar topography. In contrast to the 2D case, where all flow is forced to go over the topography, the 3D case has the added complexity that the oscillating flow can either go over or around the topography. We characterize the boundary layer near the topography, and show how regions containing large vertical motion lead to the observed angular dependence of the wave field.

[1]P. Holloway, M. Merrifield, J. Geophys. Res. **104**, 25,937 (1999)
[2]J. R. Munroe, K. G. Lamb, J. Geophys. Res. **110**, C02001 (2005)

Benjamin King
University of Texas at Austin

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